Foundations 2: Multinomial-Processing-Tree Modeling
Basic Methods and Recent Advances

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Workshop Day 1: Essentials of MPT Modeling (Monday, 14.06.2020, 9:00-13:00)

Slides with audio explanations (please study before the Interactive Online Session!):

- Basics (Instructor: EE)
  - Introduction to standard MPT models (logic, examples, advantages, limitations)
  - Model development (model construction, paradigm, data structure, identifiability)
  - Parameter estimation (maximum likelihood, minimum χ^2, power-divergence statistics)
  - Model assessment (G^2, Pearson's χ^2, and the PD^{λ} family of goodness-of-fit statistics)
- Application I (Instructor: EE)
  - Introduction to multiTree: EQN syntax, data files, batch analysis
  - Practical exercises: Demonstrations using the Paired-Clustering Model
  - Order constraints: Demonstrations using the Paired-Clustering Model

Interactive Online Session:

- 9:00 – 10:00 Questions & clarifications of practical exercises
- 10:00 – 11:00 Advanced features of multiTree (Instructor: EE)
  - Identifiability concepts and checks provided by multiTree
  - A priori and post hoc statistical power analyses
  - Model selection (AIC, BIC, NML, and FIA criterion)
- 11:00 – 13:00 Application II (Instructor: EE & DH)
  - Workflow with multiTree: Developing and testing a new MPT model
  - Using advanced features in multiTree
  - Optional: Testing interactions (EE)

Workshop Day 2: Advances in MPT Modeling (Tuesday, 15.06.2020, 13:00-17:00)

Slides with audio explanations (please study before the Interactive Online Session!):

- Bayesian hierarchical MPT modeling (Instructor: DH)
  - MPT models & heterogeneity
  - Hierarchical MPT models
  - Bayesian estimation with MCMC sampling
  - Adding continuous covariates
- Modeling continuous data using mixture models (Instructor: DH)
  - Modeling response times with histograms (MPT-RT)
  - Parametric modeling with generalized processing trees (GPT)
  - Serial process model for response times (RT-MPT)

Interactive Online Session:

- 13:00 – 14:00 Questions & clarifications
- 14:00 – 16:00 Application III (Instructor: DH)
    - Practical exercises on hierarchical MPT modeling using TreeBUGS
    - Basics: Model fitting, convergence, plots, model fit
    - Advanced: Within-/between-subject comparisons, covariates, simulation
- 16:00 - 17:00 Application IV (Instructors: DH & EE)
    - Questions and answers
    - Developing and testing (new) models suggested by the participants